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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characteristics and the origins of the carbonaceous aerosol at a rural site of PRD in summer 2006" *by* W. W. Hu et al.

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The authors wish to thank the referees' valuable comments and feedback on our manuscript. We have endeavoured to address each of the referee's suggestion and comments. A detailed response to the comments is shown below. We welcome any further feedback that the editor and/or referees may have.

Response to Referee 1#

Specific comments

1.Xiao et al. (2011) also analyzed the same OC and EC data at same site and discussed their sources and processes. A brief summary and a comparison with Xiao et al.'s work are necessary.

Response: Thanks for referee's comments. A brief summary of xiao et al (2011) has been added to the paper. Line 249-251: "...Previously, Xiao et al (2011) used a rough EC tracer method (set (OC/ECÂň)pri to 1.1) to separate POC and SOC basing on this dataset. To improve the accuracy of SOC estimation...".

2.Page 21606, line 4-5: Xiao et al. (2011) identified three organic aerosol components, including HOA, SV-OOA, and LV-OOA. Is OOA here the sum of LV-OOA and SV-OOA or the results from 2-factor PMF analysis?

Response: The OOA used in this paper is the sum of LV-OOA and SV-OOA. Line 113-116: "The OM was divided into hydrocarbon-like organic aerosol (HOA) and oxygenated organic aerosol (OOA) (OOA=low volatility (LV)-OOA+Semi-volatile (SV)-OOA) by using positive matrix factorization (PMF) to mass spectrum (Xiao et al., 2011).".

3.Page 21607, line 5: The regression slope of OM vs. OC is 1.01, suggesting that OM is almost carbon. This value is even lower than those (1.2) of primary organic particles from traffic emissions (Mohr et al., 2009). A more detailed explanation is needed.

Response: We have changed the Fig. 3a and Fig. 3b. (Fig. 4a and Fig. 4b in the revised manuscript, Fig.1 in this response text). Comparing the original ones, we separately showed the data points for primary emissions days and normal days. For the primary emission days, the OM/OC ratio was quite low (1.0), which means the plume was quite fresh. The following part of SOC calculation also showed neglegible levels of secondary formation. For normal days, the OM/OC ratio was 1.6, which resulted in the average 47% OC attributed to be the SOC. In the original Fig. 3a, all the data points were linear fitted in the campaign and the slope almost equals to the value in primary emission days. We think that the fit is somewhat erroneous and the linear fit weight too much to the points from the primary emission days due to the extreme high concentrations. So, we corrected the figures and also the relevant text.

Text from paper, line 184-189: "...The OM and OC concentrations showed good cor-

relations both in primary emission days and the other days (normal days, typhoon and precipitation days) (both R2 were 0.83) in Fig. 4a. During the primary emission days, the OM/OC ratio was quite low (1.0) that was much lower than the one (1.6) in normal and typhoon and precipitation days. Previous studies show that the more aged air masses tend to have higher OM/OC ratio (Aiken et al 2008; Turpin and Lim, 2001), implying the OM and OC in the other days were more aged than that in primary emission days. . . .".

4.Page 21609, line 27-28. I didn't see a peak of OC around 02:00. In addition, 07:00 or 19:00?

Response: Sorry for the mistake. We corrected that in the paper. Text of the paper, line 210-211: ". . .The averaged OC was also found to display similar diurnal pattern with two peaks at 6:00 (6.8 μgC/m3) and 19:00 (8.0 μgC/m3).".

5.Fig. 8b: the legend is not correct. Should be SOC = *_WSOC + **

Response: Thanks for referee's correction. We revised that in Fig. 8 (b) "SOC=(0.7$\pm$0.03)*WSOC-(0.5$\pm$0.2)".

6.The English is readable, but needed to be improved. For example, page 21602, line 3: "by using" to "using"; page 21609, line 14: "showed" to "shown"

Response: Thanks for referee's adivices. The manuscript has been revised by all of the co-authors to make sure there is no grammar error.

Reference:

Xiao, R., Takegawa, N., Zheng, M., Kondo, Y., Miyazaki, Y., Miyakawa, T., Hu, M., Shao, M., Zeng, L., Gong, Y., Lu, K., Deng, Z., Zhao, Y., and Zhang, Y. H.: Characterization and source apportionment of submicron aerosol with aerosol mass spectrometer during the PRIDE-PRD 2006 campaign, Atmos. Chem. Phys. Discuss., 11, 1891-1937, 10.5194/acpd-11-1891-2011, 2011.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 21601, 2011.

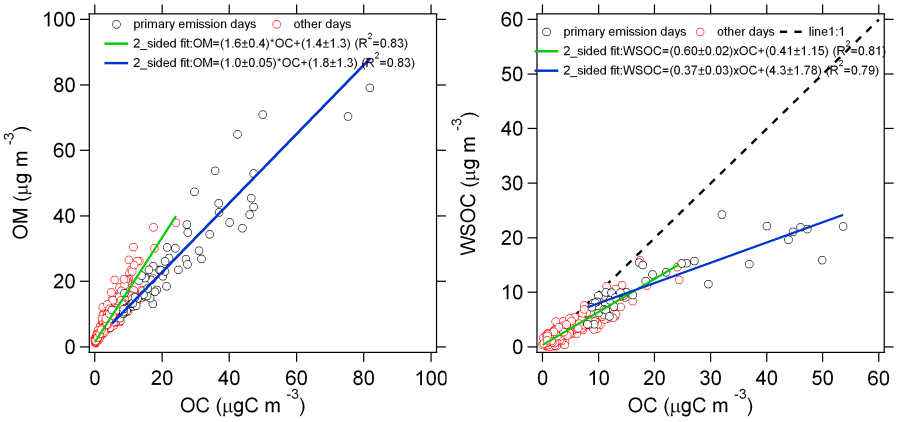

Fig. 1. The correlations of measured data between (a) OM and OC; (b) WSOC and OC.(Fig. 3 in Discussion paper and Fig 4 in revised manuscript)